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Abstract

Background
The effect of parenting behaviours is important in child health and development research. This study evaluates three child-reported parenting behaviour scales (nurturance, rejection and monitoring) in the Canadian National Longitudinal Survey of Children and Youth (NLSCY).

Data and methods
The sample consisted of two longitudinal cohorts (n = 1,164) who were interviewed at ages 10 to 11, 12 to 13, and 14 to 15. The factor structure of each scale was evaluated using confirmatory factor analysis with weighted least squares estimation on polychoric correlation matrices.

Results
The 7-item NLSCY Parental Nurturance model appeared to be a good fit to the data for children aged 10 to 11 and 12 to 13, but not for those aged 14 to 15. The 7-item Parental Rejection model was not a good fit to the data across any of the three time points. The 5-item Parental Monitoring model was a good fit to the data across all three time points. Removal of one item from the nurturance and one item from the monitoring scale improved the fit to the data.

Interpretation
The revised models appeared to be useful in assessing parental nurturance and monitoring. The model for parental rejection was not confirmed for this sample of adolescents.

Keywords
child-rearing, data analysis, factor analysis, parent-child relations, questionnaires, rejection, validation studies

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Research has demonstrated significant relationships between parenting behaviours and child health and development.[1-6] For example, low parental nurturance and high parental rejection have been associated with anxiety, property offence and hyperactivity-inattention problems in adolescence.[3] But despite the considerable number of studies, relatively little is known about the quality of measures based on child-reported parenting behaviours.[7-9] In the absence of empirically validated measures, it is possible that some findings reflect spurious associations. This analysis addresses that gap by evaluating the factor structure of the child-reported parenting scales in Statistics Canada's National Longitudinal Survey of Children and Youth (NLSCY).

To date, no studies have evaluated the factor structure of the NLSCY child-reported parenting questionnaire. Because the parenting behaviours measured by this questionnaire are often included as risk or protective factors in NLSCY-based health research,[10] it is important that their quality be assessed.

The NLSCY is a high-profile survey, the results of which have the potential to influence policy on children's health and development.[11] It collects information about a representative sample of Canadian children and youth, which enhances the generalizability of findings. As well, because the data are longitudinal, the factor structure of the child-reported parenting questionnaire can be evaluated across time, thereby providing a stronger analytical framework for construct validation than would cross-sections of a study population.

Data and methods

The biennial NLSCY, conducted jointly by Statistics Canada and Human Resources and Skills Development Canada, began in 1994/1995. The target population for the first cycle was newborns through age 11. Households in Yukon, Nunavut, and the Northwest Territories, and children in institutional settings were excluded. The response rate was 87%, which resulted in 22,831 children in cycle 1 (1994/1995).[12] The response rates for these children in the second and third cycles were 67% and 65%, respectively.[13]

The household data were provided by the person most knowledgeable (PMK) about the child during a face-to-face or telephone interview. With the PMK's permission and in a private setting to ensure confidentiality, children aged 10 or older completed a separate questionnaire.[13]

The initial sample for this analysis consisted of two longitudinal cohorts: the first was made up of children aged 10 to 11 in 1998/1999 (cycle 3) who were re-interviewed at ages 12 to 13 in 2000/2001 (cycle 4), and at ages 14 to 15 in 2002/2003 (cycle 5); the second cohort was children aged 10 to 11 in 2000/2001 (cycle 4) who were re-interviewed at ages 12 to 13 in 2002/2003 (cycle 5), and at ages 14 to 15 in 2004/2005 (cycle 6).

Before the data for the two cohorts were combined, a series of independent sample t-tests (or chi-square tests for dichotomous variables) was performed to ensure that there were no systematic differences between the cohorts in demographic factors such as gender, household income and PMK education, or in parental nurturance, rejection and monitoring at each age. The findings indicated that socio-economic characteristics differed across cohorts, but these differences varied by age group and cohort. For example, PMKs of children in cohort 1 reported lower household income than did those in cohort 2 at ages 10 to 11, but the reverse was found at ages 14 to 15.

Nurturance was the only parenting variable for which a statistically significant difference emerged, with a small effect size at ages 10 to 11 and 12 to 13 (children in cohort 2 reported higher levels of nurturance than did children in cohort 1).

The response format for the questionnaire was changed from a 4-point scale in cycle 1 to a 5-point scale in subsequent cycles; some items were removed after cycle 1; and new items were added after cycle 2. To ensure the consistency of items and of the response scale, the sample was drawn from cycles 3 to 6.

The final sample for the study consisted of 1,164 children who were interviewed at ages 10 to 11, 12 to 13, and 14 to 15, and who had complete data on the three parenting behaviour scales. The impact of cycle-to-cycle attrition and attrition due to missing data was examined in a series of independent t-tests (or chi-square tests for dichotomous variables). The final sample had a somewhat higher socio-economic status than did the initial sample, but the effect size measures were small.

Of the children in the analysis, 53% were female; 75% lived with their biological parents; 15% lived in a single-parent household; and 59% lived in a household with an annual income of $50,000 or more when they were aged 10 to 11. Most PMKs (91%) had at least secondary graduation.

Parenting questionnaire

The child-reported parenting questionnaire was developed by Lempers et al.,[14] and was based on Schaefer's[15] Children's Report of Parental Behavior Inventory and on the Child Rearing Practices Report of Roberts et al.[16] The original 29-item questionnaire measured three parenting behaviours: nurturance, inconsistent rejection-oriented discipline, and monitoring. *Nurturance* denotes positive evaluation, expression of affection and equalitarian treatment. *Inconsistent rejection-oriented discipline* behaviours are negative affect, control, and hostility. *Monitoring* involves parental direction and supervision.[15,16] These three dimensions of parenting were supported through an exploratory factor analysis (EFA) using varimax rotation.[14] The alpha coefficient for all 29 items was .80. The authors did not provide the internal consistency scores for the three subscales, nor did they provide information on validity.

In the NLSCY version of the questionnaire, the wording of one item was modified, and 10 items (6 nurturance, 3 rejection, and 1 monitoring) were excluded, resulting in a 19-item scale. EFA based on the first cycle of data for children aged 10 to 11[12] revealed three factors that were labelled nurturance (7 items; alpha = .77), rejection (7 items; alpha = .59), and monitoring (5 items; alpha = .54).

Although the EFA revealed the underlying structure of this questionnaire, the low alphas suggest that a stronger empirical and conceptual evaluation of the measure is necessary to provide support for construct validity.[17] Confirmatory factor analysis (CFA) has been shown to be a highly effective approach to providing support for construct validation.[18] Unlike EFA, CFA of each parenting behaviour model (nurturance, rejection and monitoring) provides support for construct validity to the extent that the constructs are measured by the specified indicators, and are related in a theoretically predictable manner.

Data analysis

The three parenting behaviours—nurturance (for example, "my parents smile at me"), rejection (for example, "my parents hit me or threaten to do so"), and monitoring (for example, "my parents want to know exactly where I am and what I am doing")—were assessed using a 5-point response scale ranging from 0 (never) to 4 (always), with higher scores indicating that the child perceived more nurturing, rejection and monitoring. (The item "[my parents] let me go out any evening I want" in the monitoring scale was reverse-coded.)

Ordinal coefficient alpha was used to estimate the reliability of the three scales.[19] Across the three time points

(at ages 10 to 11, 12 to 13, and 14 to 15, respectively), the estimates of reliability were "high" for the nurturance scale (.90, .92, .94), "good" for the rejection scale (.75, .79, .83), and "acceptable-to-satisfactory" for the monitoring scale (.63, .65, .70)

A separate set of CFAs was conducted to evaluate the factor structure of each parenting scale across the three time points. Because of the construct-confirming nature of the study, the data were not weighted; the lack of generalizability of the findings at the population level is recognized.[20] The CFAs were run using the LISREL 8.80 program,[21] with weighted least squares (WLS) estimation[22] on polychoric covariance[23] and asymptotic variance/covariance matrices, which were computed using PRELIS[24] (version 2.80). Model fit was evaluated using the following global goodness-of-fit indices: the root mean square error of approximation[25] (RMSEA) and the 90% confidence interval (CI) for RMSEA; the comparative fit index[26] (CFI); and the standardized version of the Root Mean Squared Residual[27] (SRMR). An RMSEA less than or equal to .06, a CFI .95 or more, and a SRMR less than or equal to .08 indicated a good fit of the model to the data.[28] The 90% CI around the RMSEA statistics should contain .05 to indicate the possibility of a close fit.[29] In addition to the criteria for the goodness-of-fit statistics, the parameter estimates of all items[30] were considered, as well as the standardized residual matrix[31] to evaluate model fit. For this study, the standardized factor loading values were expected to be greater than or equal to .30,[17,32] and standardized residuals for each item to be consistently less than 4.0.[31]

Results

Nurturance

The 7-item NLSCY Parental Nurturance model (Table 1) was a good fit to the data for children aged 10 to 11 (RMSEA = .038, 90%CI = .024 to .053; CFI = .986; and SRMR = .035) and for children aged 12 to 13 (RMSEA = .039, 90%CI = .025 to .054; CFI = .989; and SRMR = .036), but not for those aged 14 to 15 (RMSEA = .078, 90%CI = .065 to .091; CFI = .981; and SRMR = .067). Although all items loaded significantly on the factor at each age group, the fourth item—"[my parents] and I solve a problem together whenever we disagree about something"—had consistently lower correlations with other items (Appendix Table A). This item taps into the construct of problem-solving and so may have a different meaning

Table 1
Factor loadings (FL), item uniqueness (IU), and range of residuals (RES) for items in single-factor models in child-reported parenting questionnaire, by age group of respondents, household population aged 10 to 15, Canada excluding territories, 1998/1999, 2000/2001, 2002/2003 and 2004/2005

	Ages 10 to 11				Ages 12 to 13				Ages 14 to 15			
			RES				RES				RES	
Parenting behaviour	FL	IU	from	to	FL	IU	from	to	FL	IU	from	to
Nurturance												
My parents . . .												
1. smile at me	.75	.44	-2.42	1.57	.76	.42	-2.71	-.05	.77	.41	-6.16	1.19
2. praise me	.68	.55	-3.50	1.57	.78	.40	-3.39	-.05	.91	.18	-7.91	1.19
3. listen to my ideas and opinions	.78	.40	-3.63	2.44	.83	.31	-4.29	4.11	.89	.20	-7.91	3.90
4. and I solve a problem together whenever we disagree	.67	.55	-3.53	2.44	.70	.51	-3.50	4.11	.79	.37	-7.29	3.90
5. make sure I know I am appreciated	.78	.40	-2.90	.15	.83	.32	-3.39	-1.43	.89	.21	-6.79	-2.55
6. speak of the good things I do	.85	.27	-3.53	.77	.89	.20	-4.29	.54	.91	.17	-7.22	1.68
7. seem proud of the things I do	.87	.25	-3.63	.77	.87	.24	-3.13	.54	.91	.17	-7.29	1.68
Rejection												
My parents . . .												
8. soon forget a rule they have made	.44	.81	-4.11	3.38	.55	.70	-4.93	1.69	.45	.80	-5.03	1.32
9. nag me about little things	.56	.69	-2.09	.54	.58	.66	-2.87	-.03	.66	.57	-4.54	.09
10. only keep rules when it suits them	.37	.87	-4.72	6.08	.50	.75	-5.99	5.18	.62	.61	-5.85	4.56
11. threaten punishment more often than they use it	.63	.61	-3.99	1.44	.67	.55	-5.99	-.03	.70	.51	-5.76	.09
12. enforce a rule or do not enforce a rule depending upon their mood	.55	.70	-5.07	6.08	.69	.53	-7.75	5.18	.69	.52	-5.51	4.56
13. hit me or threaten to do so	.79	.38	-5.07	3.11	.68	.54	-6.06	4.40	.79	.37	-5.51	.90
14. get angry and yell at me	.72	.48	-4.65	3.11	.77	.40	-7.75	4.40	.81	.35	-5.85	.90
Monitoring												
My parents . . .												
15. want to know exactly where I am and what I am doing	.66	.56	-3.28	.22	.71	.50	-2.07	1.24	.75	.44	-1.20	1.22
16. let me go out any evening I want	.12	.99	-.78	.87	.14	.98	-.91	.78	.25	.94	-3.38	3.02
17. do tell me what time to be home when I go out	.57	.68	-3.17	1.10	.63	.61	-2.26	1.24	.69	.52	-2.74	3.02
18. find out about my misbehavior	.54	.71	-3.28	.68	.42	.82	-2.07	1.39	.39	.85	-1.20	.75
19. take an interest in where I am going and who I am with	.73	.47	-3.17	.59	.75	.44	-2.26	1.39	.84	.30	-3.38	.75

Source: 1998/1999 to 2005/2006 National Longitudinal Survey of Children and Youth.

than nurturing. An examination of the parental nurturance questionnaires that were recently reviewed by Locke and Prinz,[33] confirmed that most nurturance scales did not include problem-solving items. In addition, at ages 14 to 15, five out of six standardized residuals were above 4.0 for the fourth item (range of residuals = -7.29 to 3.90), suggesting a high degree of error in prediction. Item 4 was removed from the scale, and a new set of CFAs were performed.

The revised 6-item Parental Nurturance model was a good fit to the data (RMSEA = .037, 90%CI = .018 to .055; RMSEA = .024, 90%CI = .001 to .045; RMSEA = .039, 90%CI = .022 to .058; CFI = .991; .997; .996; and SRMR = .029; .021; .020, at ages 10 to 11; 12 to 13, and 14 to 15, respectively) (Table 2). All items loaded significantly on the factor, and the standardized residuals were greatly reduced for each age group.

Rejection

The 7-item NLSCY Parental Rejection model was not a good fit to the data across any of the three time points (RMSEA = .069, 90%CI = .055 to .082; RMSEA = .078, 90%CI = .063 to .090; RMSEA = .070, 90%CI = .057 to .084; CFI = .889; .895; .936; and SRMR = .064; .079; .067, at ages 10 to 11, 12 to 13, and 14 to 15, respectively). Consequently, the model was not confirmed for this sample of adolescents. An inspection of the factor loadings and item uniqueness failed to identify specific items that were negatively influencing fit. The items generally had low loadings (although all items significantly loaded on the factor), high item uniqueness, and a wide range of residuals across three time points (Table 1).

Monitoring

The 5-item NLSCY Parental Monitoring model was a good fit to the data across all three time points (RMSEA = .035, 90%CI = .008 to .060; RMSEA = .001, 90%CI = .001 to .043; RMSEA = .041, 90%CI = .018 to .066; CFI = .982; .999; .988; and SRMR = .025; .012; .027, at ages 10 to 11, 12 to 13, and 14 to 15, respectively). All items loaded significantly on the factor. However, the second item—"[my parents] let me go out any evening I want"—had very low factor loadings and high item uniqueness across all three time points (Table 1). The ambiguous wording of the item lends itself to various interpretations. For example, some adolescents might regard being able to go out any evening they want as a lack of parental care, but others might view it as being granted appropriate independence and an indication of trust. This ambiguity was noted by Lempers et al.,[14] who showed that the item loaded weakly on the Parental Nurturance scale ($\lambda < .30$) rather than on the Parental Monitoring scale. The item was removed from the NLSCY scale, and a new set of CFAs were run.

The revised 4-item Parental Monitoring model was a good fit to the data across all three time points (RMSEA = .060, 90%CI = .028 to .098; RMSEA = .033, 90%CI = .001 to .075; RMSEA = .000, 90%CI = .001 to .052; CFI = .978; .994; 1.00; and SRMR = .027; .018; .010, at ages 10 to 11, 12 to 13, and 14 to 15, respectively). All items significantly loaded on the factor, and the problems with the parameter estimates were resolved (Table 2).

Discussion

The aim of this study was to assess the construct validity of the child-reported parenting measures in the NLSCY. The only model with a good fit (based

Table 2
Factor loadings (FL), item uniqueness (IU), and range of residuals (RES) for items in revised parental nurturance and monitoring models in child-reported parenting questionnaire, by age group of respondents, household population aged 10 to 15, Canada excluding territories, 1998/1999, 2000/2001, 2002/2003 and 2004/2005

	Ages 10 to 11				Ages 12 to 13				Ages 14 to 15			
			RES				RES				RES	
Parenting behaviour	FL	IU	from	to	FL	IU	from	to	FL	IU	from	to
Nurturance (revised model)*												
My parents . . .												
1. smile at me	.74	.45	-2.55	1.75	.75	.44	-2.37	1.15	.76	.42	-3.45	3.35
2. praise me	.68	.54	-3.52	1.75	.76	.42	-2.67	1.15	.90	.20	-2.65	3.35
3. listen to my ideas and opinions	.76	.42	-2.80	1.12	.80	.36	-2.79	.10	.80	.36	-1.80	.47
5. make sure I know I am appreciated	.77	.41	-2.99	1.12	.82	.32	-2.67	.10	.88	.22	-2.49	.47
6. speak of the good things I do	.86	.26	-2.99	.65	.89	.20	-2.79	1.01	.91	.18	-3.45	3.66
7. seem proud of the things I do	.86	.26	-3.52	.65	.87	.25	-2.35	1.01	.91	.18	-2.65	3.66
Monitoring (revised model)†												
My parents . . .												
15. want to know exactly where I am and what I am doing	.66	.56	-3.20	.29	.71	.44	-2.13	1.30	.75	.44	-.92	1.15
17. do tell me what time to be home when I go out	.56	.68	-3.18	1.35	.62	.36	-2.14	1.30	.67	.55	-1.02	1.15
18. find out about my misbehavior	.53	.72	-3.20	.93	.42	.32	-2.13	1.39	.38	.85	-.92	1.12
19. take an interest in where I am going and who I am with	.73	.47	-3.18	.93	.75	.20	-2.14	1.39	.84	.30	-1.02	1.12

* excludes item 4 from original scale (my parents and I solve a problem together whenever we disagree)
† excludes item 16 from original scale (my parents let me go out any evening I want)
Source: 1998/1999 to 2005/2006 National Longitudinal Survey of Children and Youth.

What is already known on this subject?

- Analyses based on data from the National Longitudinal Survey of Children and Youth data (NLSCY) often include child-reported parenting behaviours as risk or protective factors.
- Little is known about the quality of the NLSCY parenting behaviour scales, as no studies have assessed their validity.

What does this study add?

- The 5-item Parental Monitoring model was a good fit to the data.
- The 7-item NLSCY Parental Nurturance model was a good fit to the data for children aged 10 to 11 and 12 to 13, but not for 14- to 15-year-olds.
- The 7-item Parental Rejection model was not a good fit to the data; consequently, the model was not confirmed for the sample of adolescents in the study.
- Removal of one item from the Parental Monitoring scale and one item from the Parental Nurturance scale improved the fit to the data.
- Use of the revised models is recommended for research exploring relationships between parenting behaviour and child outcomes.

on global goodness-of-fit statistics criteria) across all three time points was the Parental Monitoring scale. Further, removal of one conceptually and empirically weak item improved the measurement properties of the scale. Based on these findings, use of the revised scale is recommended.

From the perspective of terminological precision, "parental monitoring" may not capture the essence of the construct. Monitoring has been defined as a "prevention or intervention" technique used by parents.[34,35] However, most measures of monitoring assess parental knowledge, which originates mainly from the child's willingness to disclose rather than parents' efforts to supervise.[36-38] Therefore, it is recommended that "parental knowledge" or "monitoring efforts" be used as a new label for the current Parental Monitoring scale.

The Parental Nurturance scale was initially confirmed only for times 1 and 2 (at ages 10 to 11 and 12 to 13), but not at time 3 (at ages 14 to 15). Inclusion of the problem-solving item could not be conceptually justified. When this item was removed, the model was confirmed for all time points. Therefore, use of the revised scale is recommended.

The factor structure of the Parental Rejection scale was not confirmed. In addition to rejection, the items that constitute the scale encompass behaviours such as inconsistency and harshness. In fact, the original name was the "inconsistent rejection-oriented discipline" scale.[14] Sabatelli and Waldron[39] have suggested that although an EFA may provide support for the interrelationships among specific items in a scale, those items may not represent a theoretically coherent set of indicators for a particular construct. This appears to be the case for the Parental Rejection scale. Research is warranted to establish the defining features of the rejection construct, and to review related constructs (for instance, harsh parenting) to clarify the conceptual relationships between them.

Limitations

This study has a number of methodological limitations. First, although the sample was relatively large, it may not be representative. Many participants were excluded because of longitudinal attrition or non-completion of the parenting questionnaire. In fact, analyses of missing data revealed higher socio-economic status (SES) for the final sample compared with the initial sample. Therefore, the findings may not apply to a sample with low SES. As well, owing to the construct-confirming goal of the study, missing data were not imputed. A replication study would be useful to compare these findings with those obtained from a larger, more representative sample.

A second potential limitation is use of the same sample to confirm the NLSCY models and the revised models. From a strict CFA point of view, removing one item from a model may require a new, independent dataset to confirm the revised model.[40] However, the revisions to the original models were minor and not completely exploratory; they were conceptually driven based on careful inspection of items.

Conclusion

Although the results of this analysis raise concerns about the construct conceptualization and item content of the three NLSCY child-reported parenting scales, the two revised models appear to be useful in assessing nurturance and monitoring for adolescents aged 10 to 15. Research is needed to evaluate the predictive utility of these scales by examining their association with child health and development. ■

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References

1. Cummings EM, Davies P, Campbell SB. *Developmental Psychopathology and Family Process: Research, Theory, and Clinical Implications*. New York: Guilford Press, 2000.
2. Masten AS, Shaffer A. How families matter in child development: Reflections from research on risk and resilience. In: Clarke-Stewart A, Dunn, J, eds. *Families Count: Effects on Child and Adolescent Development*. New York: Cambridge University Press, 2006: 5-25.
3. Dahinten VS, Shapka JD, Willms JD. Adolescent children of adolescent mothers: The impact of family functioning on trajectories of development. *Journal of Youth and Adolescence* 2007; 36:195-212.
4. Pires P, Jenkins JM. A growth curve analysis of the joint influences of parenting affect, child characteristics and deviant peers on adolescent illict drug use. *Journal of Youth and Adolescence* 2007; 36:169-83.
5. Elgar FJ, Mills RSL, McGrath PJ, et al. Maternal and paternal depressive symptoms and child maladjustment: The mediating role of parental behavior. *Journal of Abnormal Child Psychology* 2007; 35: 943-55.
6. Arim RG, Dahinten VS, Marshall SK, Shapka JD. An examination of the reciprocal relationships between adolescents' aggressive behaviors and their perceptions of parental nurturance. *Journal of Youth and Adolescence* (in press).
7. Dishion TJ, Burraston B, Li F. Family management practices: Research design and measurement issues. In: Bukowski WJ, Sloboda Z., eds. *Handbook for Drug Abuse Prevention: Theory, Science, and Practice*. New York: Kluwer Academic/Plenum, 2003: 587-607.
8. Karazsia BT, van Dulmen MHM, Wildman BG. Confirmatory factor analysis of Arnold et al.'s parenting scale across race, age, and sex. *Journal of Child and Family Studies* 2008; 17: 500-16.
9. Dix T, Gershoff ET. Measuring parent-child relations. In: Touliatos J, Perlmutter BF, Strauss MA, eds. *Handbook of Family Measurement Techniques*. Thousand Oaks: Sage, 2001: 125-42.
10. Statistics Canada. Research Data Centers Program. Available at: http://www.statcan.gc.ca/rdc-cdr/proje_nlscy-elnej-eng.htm.
11. Willms JD. *Vulnerable Children. Findings from the National Longitudinal Survey of Children and Youth*. Edmonton: The University of Alberta Press and Human Resources Development Canada, 2002.
12. Statistics Canada, Human Resources Development Canada. *The National Longitudinal Survey of Children and Youth: Cycle 1 User Guide*. Ottawa: Minister of Industry, 1995.
13. Statistics Canada, Human Resources Development Canada. *The National Longitudinal Survey of Children and Youth: Cycle 3 User Guide*. Ottawa: Minister of Industry, 1998.
14. Lempers JD, Clark-Lempers D, Simons RL. Economic hardship, parenting, and distress. *Child Development* 1989; 60: 25-39.
15. Schaefer ES. Children's report of parental behavior: An inventory. *Child Development* 1965; 36: 413-24.
16. Roberts GC, Block JH, Block J. Continuity and change in parent's child-rearing practices. *Child Development* 1984; 55: 586-97.
17. Brown TA. *Confirmatory Factor Analysis for Applied Research*. New York: Guilford Press, 2006.
18. DiStefano C, Hess B. Using confirmatory factor analysis for construct validation: An empirical review. *Journal of Psychoeducational Assessment* 2005; 23: 225-41.
19. Zumbo BD, Gadermann AM, Zeisser C. Ordinal versions of coefficient aplhas and theta for Likert rating scales. *Journal of Modern Applied Statistical Methods* 2007; 6: 21-9.
20. Ciol MA, Hoffman JM, Dudgeon BJ, et al. Understanding the use of weights in the analysis of data from multistage surveys. *Archives of Physical Medicine and Rehabilitation* 2006; 87: 299-303.
21. *LISREL 8.80 for Windows* [program]. Lincolnwood: Scientific Software International, 2006.
22. Jöreskog KG. Structural Equation Modeling with Ordinal Variables using Lisrel. Lincolnwood: Scientific Software International, 2002. Available at: http://www.ssicentral.com/lisrel/corner.htm.
23. Flora DB, Curran PJ. An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological Methods* 2004; 4: 466-91.
24. *PRELIS 2.80 for Windows* [program]. Lincolnwood: Scientific Software International, 2006.
25. Steiger JH. Point estimation, hypothesis testing, and interval estimation using the RMSEA: Some comments and a reply to Hayduk and Glaser. *Structural Equation Modeling* 2000; 7: 149-62.
26. Bentler P. Comparative fit indices in structural models. *Psychological Bulletin* 1990; 107: 238-46.
27. Jöreskog KG, Sorbom, D. *Lisrel's 8 User's Reference Guide*. Lincolnwood: Scientific Software International, 2001.
28. Hu L, Bentler, P. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling* 1999; 6: 1-55.
29. Browne MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA, Long JS, eds. *Testing Structural Equation Models*. Newbury Park: Sage, 1993: 136-62.
30. Schumacker RE, Lomax RG. *A Beginner's Guide to Structural Equation Modeling. Second Edition*. Mahwah: Lawrence Erlbaum, 2004.
31. Jöreskog KG, Moustaki I. Factor analysis of ordinal variables. A comparison of three approaches. *Multivariate Behavioral Research* 2001; 36: 347-87.
32. DiStefano C. The impact of categorization with confirmatory factor analysis. *Structural Equation Modeling: A Multidisciplinary Journal* 2002; 9: 327-46.
33. Locke LM, Prinz RJ. Measurement of parental discipline and nurturance. *Clinical Psychology Review* 2002; 22: 895-930.
34. Laird RD, Pettit GS, Dodge KA, Bates JE. Change in parents' monitoring-relevant knowledge: Links with parenting, relationship quality, adolescent beliefs, and antisocial behavior. *Social Development* 2003; 12: 401-19.
35. Montemayor R. Parental monitoring. In: Lerner JV, Lerner RM, Finkelstein J, eds. *Adolescence in America: An Encyclopedia*. Santa Barbara: ABC-CLIO, 2001.
36. Crouter AC, Head MR. Parental monitoring and knowledge of children. In: Bornstein M, ed.. *Handbook of Parenting: Being and Becoming a Parent. Second Edition*. Mahwah: Lawrence Erlbaum, 2002: 461-83.
37. Kerr M, Stattin H. What parents know, how they know it, and several forms of adolescent adjustment: Further support for a reinterpretation of monitoring. *Developmental Psychology* 2000; 36: 366-80.
38. Stattin H, Kerr M. Parental monitoring: A reinterpretation. *Child Development* 2001; 71: 1072-85.
39. Sabatelli RM, Waldron RJ. Measurement issues in the assessment of the experiences of parenthood. *Journal of Marriage and the Family* 1995; 57: 969-80.
40. Kuhnel S. The didactical power of structural equation modeling. In: Jöreskog KG, Cudeck R, Du Toit SHC, Sorbom D, eds. *Structural Equation Modeling: Present and Future: A Festschrift in Honor of Karl Jöreskog*. Lincolnwood: Scientific Software International, 2001: 79-96.

Appendix

Table A
Polychoric correlation coefficients of child-reported parental behaviour scale items at three time points, by type of scale and age group of respondents, household population aged 10 to 15, Canada excluding territories, 1998/1999, 2000/2001, 2002/2003 and 2004/2005

Number	Item	Age group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Nurturance																						
1	1	10 to 11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	2	10 to 11	.53	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	3	10 to 11	.53	.52	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	4	10 to 11	.47	.41	.57	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	5	10 to 11	.56	.51	.60	.51	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	6	10 to 11	.59	.56	.61	.51	.62	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	7	10 to 11	.60	.52	.61	.53	.63	.75	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	1	12 to 13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9	2	12 to 13	...	...	...	...	...	...	...	.59	...	...	...	...	...	...	...	...	...	...	...	...
10	3	12 to 13	...	...	...	...	...	...	...	.59	.60	...	...	...	...	...	...	...	...	...	...	...
11	4	12 to 13	...	...	...	...	...	...	...	.50	.50	.64	...	...	...	...	...	...	...	...	...	...
12	5	12 to 13	...	...	...	...	...	...	...	.60	.58	.66	.55	...	...	...	...	...	...	...	...	...
13	6	12 to 13	...	...	...	...	...	...	...	.63	.67	.67	.57	.72	...	...	...	...	...	...	...	...
14	7	12 to 13	...	...	...	...	...	...	...	.62	.62	.67	.56	.71	.78	...	...	...	...	...	...	...
15	1	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	2	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.71	...	...	...	...	...
17	3	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.59	.70	...	...	...	...
18	4	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.50	.60	.74	...	...	...
19	5	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.65	.77	.71	.61	...	...
20	6	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.65	.79	.71	.61	.78	...
21	7	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.66	.78	.72	.61	.78	.84
Rejection																						
1	1	10 to 11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	2	10 to 11	.24	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	3	10 to 11	.25	.18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	4	10 to 11	.24	.36	.12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	5	10 to 11	.27	.28	.35	.31	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	6	10 to 11	.22	.39	.16	.52	.31	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	7	10 to 11	.29	.39	.19	.42	.30	.61	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	1	12 to 13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9	2	12 to 13	...	...	...	...	...	...	...	.31	...	...	...	...	...	...	...	...	...	...	...	...
10	3	12 to 13	...	...	...	...	...	...	...	.32	.23	...	...	...	...	...	...	...	...	...	...	...
11	4	12 to 13	...	...	...	...	...	...	...	.30	.39	.19	...	...	...	...	...	...	...	...	...	...
12	5	12 to 13	...	...	...	...	...	...	...	.38	.37	.45	.38	...	...	...	...	...	...	...	...	...
13	6	12 to 13	...	...	...	...	...	...	...	.24	.31	.19	.44	.31	...	...	...	...	...	...	...	...
14	7	12 to 13	...	...	...	...	...	...	...	.32	.42	.32	.51	.37	.59	...	...	...	...	...	...	...
15	1	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16	2	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.25	...	...	...	...	...
17	3	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.31	.38	...	...	...	...
18	4	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.29	.46	.31	...	...	...
19	5	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.34	.39	.51	.45	...	...
20	6	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.25	.40	.38	.50	.44	...
21	7	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.25	.51	.37	.53	.45	.65
Monitoring																						
1	1	10 to 11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	2	10 to 11	.06	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	3	10 to 11	.38	.10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	4	10 to 11	.29	.08	.33	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5	5	10 to 11	.48	.07	.36	.40	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	1	12 to 13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	2	12 to 13	...	...	...	...	...	.08	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	3	12 to 13	...	...	...	...	...	.46	.08	...	...	...	...	...	...	...	...	...	...	...	...	...
9	4	12 to 13	...	...	...	...	...	.26	.08	.28	...	...	...	...	...	...	...	...	...	...	...	...
10	5	12 to 13	...	...	...	...	...	.53	.11	.44	.33	...	...	...	...	...	...	...	...	...	...	...
11	1	14 to 15	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12	2	14 to 15	...	...	...	...	...	...	...	...	...	...	.21	...	...	...	...	...	...	...	...	...
13	3	14 to 15	...	...	...	...	...	...	...	...	...	...	.51	.25	...	...	...	...	...	...	...	...
14	4	14 to 15	...	...	...	...	...	...	...	...	...	...	.27	.09	.25	...	...	...	...	...	...	...
15	5	14 to 15	...	...	...	...	...	...	...	...	...	...	.62	.15	.56	.33	...	...	...	...	...	...

... not applicable
Source: 1998/1999 to 2005/2006 National Longitudinal Survey of Children and Youth.